

WHAT IS CLAIMED IS:

1. A device for monitoring the condition of a container, the device comprising:
 - means for sensing at least one condition of the container;
 - 5 means for transmitting information relative to the at least one sensed condition to a location outside the container;
 - means for interpreting the at least one sensed condition; and
 - wherein the means for interpreting is adapted to be disposed inside the container.

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2. The device as set forth in claim 1, wherein the container includes at least one door and the device is adapted for mounting relative to the container between a region of the door and an adjacent region of the container.

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3. The device as set forth in claim 2, wherein the adjacent region of the container comprises a vertical beam and adjacent C-channel and the location within the container for mounting at least a portion of the device comprises an area across the vertical beam and adjacent C-channel.

4. The device as set forth in claim 3, wherein the at least one sensed condition comprises a sensed pressure of the door against the region of the container, and the means for sensing comprises at least one pressure sensor adapted to extend between the door and the region of the container.

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5. The device as set forth in claim 4, wherein the container door further includes a gasket, and the sensed pressure comprises the pressure of the door gasket against the pressure sensor.

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6. The device as set forth in claim 1, wherein the at least one sensed condition comprises a sensed light, and wherein the means for sensing comprises a light sensor disposed inside the container.

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7. The device as set forth in claim 1, wherein the at least one sensed condition comprises a sensed motion, and wherein the means for sensing comprises a motion sensor disposed inside the container.

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8. The device as set forth in claim 1, wherein the at least one sensed condition comprises a sensed radioactivity, and wherein the means for sensing comprises a radioactivity sensor disposed inside the container.

9. The device as set forth in claim 1, wherein the means for transmitting information is disposed outwardly of the sensor and adapted for positioning outside the door of the container.

5 10. The device as set forth in claim 1, further including means for receiving information.

11. The device as set forth in claim 1, further comprising means for interfacing at least one peripheral sensor inside the container.

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12. The device as set forth in claim 11, wherein the at least one peripheral sensor comprises at least one of a pressure sensor, light sensor, radioactivity sensor, temperature sensor, motion sensor, combustible gas sensor, ammonia sensor, carbon dioxide sensor, fire sensor, smoke sensor, noise sensor, humidity sensor, and digital camera.
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13. The device as set forth in claim 1, wherein the means for interpreting includes at least one power source for the device.

14. A method of electronically securing a container, the method comprising

the steps of:

selecting a container to secure;

disposing an electronic securing device within the container;

5 transmitting a request to a server;

generating by the server of a mathematically-unique security key in

response to receipt of the request;

encrypting, by the server, of the security key;

transmitting the unique and encrypted security key to the device disposed

10 within the container;

use by the device of the encrypted security key to calculate a unique result; and

storing, by the device, of the unique result.

15 15. The method as set forth in claim 14, wherein the step of selecting a

container to secure includes the steps of:

selecting an intermodal container of the type having at least one door in a pivotal relationship with the container to electronically secure; and

disposing the device within the obtainer.

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16. The method as set forth in claim 14, wherein the step of selecting a container to secure includes the step of selecting, by a reader, a container to secure.

17. The method as set forth in claim 14, wherein the step of selecting a 5 container to secure includes the steps of:

allowing at least one authorized party access to a software backbone; and selecting, by the at least one authorized party, a container to secure via the software backbone.

10 18. The method as set forth in claim 14, wherein the step of disposing the electronic securing device within the container includes the step of positioning the electronic securing device adjacent the door for sensing the pivotal relationship thereof relative to the container.

15 19. The method as set forth in claim 14, wherein the step of disposing the electronic securing device within the container includes the steps of:
securing at least one sensor inside the container; and
securing at least one transmitter relative to the container in a position permitting radio transmission to a location outside of the container.

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20. The method as set forth in claim 19, wherein the step of securing at least one sensor inside the container includes the step of securing a light sensor inside the container.

5 21. The method as set forth in claim 19, wherein the step of securing at least one sensor inside the container includes the step of securing a motion sensor inside the container.

10 22. The method as set forth in claim 19, wherein the step of securing at least one sensor inside the container includes the step of securing a temperature sensor inside the container.

23. A device for determining whether a security breach of a container has occurred, the device comprising:

15 means for detecting pressure exerted by a door of the container;
means for establishing a baseline pressure value, the baseline pressure value being related to a calculated mean value from at least two pressure detections;
means for defining a pressure threshold; and
means for determining from the pressure threshold and the detected
20 pressure whether a security breach has occurred.

24. The device as set forth in claim 23, wherein the means for defining a pressure threshold accumulates at least two sensed pressure values and calculates an average pressure value from the at least two sensed pressure values.

5 25. The device as set forth in claim 23, wherein the means for defining a pressure threshold calculates a window of acceptable pressure values, the window of acceptable pressure values defining a range of pressure values that are experienced during shipment of a container and that do not indicate a security breach.

10 26. A method of detecting a security breach of a container, the method comprising the steps of:

placing a pressure sensor adjacent a structural member and a door of the container;

monitoring the pressure sensor via a data unit located within the container;

15 determining, by the data unit, whether a security breach of the door has occurred based on a change in pressure sensed by the pressure sensor;

communicating, by the data unit, of a result of the determining step to an antenna interoperably connected to the data unit and located adjacent to and outside of the container; and

20 transmitting, by the antenna, of information relative to the communicating step.

27. The method of claim 26, further comprising:
receiving, by a reader, of the information from the antenna; and
forwarding, by the reader, of the information to the server.

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28. A method of disarming an electronically secured container having a security device therein, the method comprising the steps of:
selecting a container to disarm;
transmitting a disarming request to a server;
generating, by the server, of a disarming key in response to receipt of the
disarming request;
encrypting, by the server, of the disarming key;
transmitting the encrypted disarming key to a device associated with the
container;
decrypting, by the device, of the encrypted disarming key; and
storing, by the device, of the decrypted disarming key.

29. The method as set forth in claim 28, wherein the step of selecting a container to disarm comprises the steps of:

selecting, by a reader, a container to disarm; and

determining that further information relative to electronic securement of

5 the container is not needed.

30. The method as set forth in claim 29, further comprising the step of disengaging from logging at least one condition sensed by the device of the disarmed container.

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31. The method as set forth in claim 28, wherein the step of selecting a container to disarm comprises the steps of:

allowing authorized parties access to a software backbone; and

selecting, by at least one of the authorized parties, a container to disarm

15 via the software backbone.

32. A method of checking a security status of a previously electronically secured container of the type wherein a security device is disposed therein, the method comprising the steps of:

- transmitting, by a reader, of a device challenge to a device associated with
5 the container;
- generating, by the device, of a device response to the device challenge;
- transmitting, by the device, of the device response to the reader;
- transmitting, by the reader, of a server challenge to a server;
- generating, by the server, of a server response to the server challenge;
- 10 transmitting, by the server, of the server response to the reader;
- comparing the server response and the device response; and
- wherein, if the server response and the device response are equal, a security breach is deemed to have not occurred since the container was electronically secured.

33. A device for determining whether a security breach of a container has occurred, the device comprising:

means for sensing at least one condition of the container;

5 means for establishing a baseline value for the sensed condition;

means for defining a sensed condition value threshold; and

means for determining from the sensed condition value threshold and the sensed condition whether a security breach has occurred.

10 34. The device as set forth in claim 33 wherein the container is of the type having at least one door pivotally mounted relative to the container, and wherein the device is adapted for positioning between the door and the container for sensing the pressure exerted by the door against the device.

15 35. The device as set forth in claim 34 wherein the means for establishing a base line pressure value includes at least one pressure value existing at the time of electronic securement of the container.

36. The device as set forth in claim 35 and further including means for
20 transmitting the sensed condition of the container.

37. The device as set forth in claim 36 wherein the means for transmitting information is disposed outwardly of the pressure sensor and adapted for positioning outside the door of the container.

5 38. The device as set forth in claim 33, wherein the at least one sensed condition comprises a sensed light, and wherein the means for sensing comprises a light sensor disposed inside the container.

10 39. The device as set forth in claim 33, wherein the at least one sensed condition comprises a sensed motion, and wherein the means for sensing comprises a motion sensor disposed inside the container.

15 40. The device as set forth in claim 33, wherein the means for sensing a condition comprises at least one of a pressure sensor, light sensor, radioactivity sensor, temperature sensor, motion sensor, combustible gas sensor, ammonia sensor, carbon dioxide sensor, fire sensor, smoke sensor, noise sensor, humidity sensor, and a digital camera.

41. A device for monitoring the condition of a container of the type having at least one door pivotally mounted thereto, the device comprising:

means for sensing movement of the container door;

means for transmitting information relative to the sensed container door

5 movement;

means for interpreting the sensed door movement;

wherein the means for interpreting is disposed inside the container; and

wherein the means for transmitting is disposed relative to the container for transmission of the sensed door movement to a location outside the container.

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42. A device for determining a security condition of a container and its contents, the device comprising:

means for detecting a condition of the container and its contents;

means for establishing a baseline condition value, the baseline condition

15 value being related to normal fluctuations in the condition of the container and its contents experienced during transport;

means for defining a condition threshold; and

means for determining from the condition threshold and the detected condition, the security condition of the container.

43. The device as set forth in claim 42, wherein the means for detecting a condition comprises at least one of a pressure sensor, light sensor, radioactivity sensor, temperature sensor, motion sensor, combustible gas sensor, ammonia sensor, carbon dioxide sensor, fire sensor, smoke sensor, noise sensor, humidity sensor, and a digital camera.

44. A method of detecting a security condition of a container and its contents, the method comprising the steps of:

10 placing a sensor within the container;

monitoring the sensor via a data unit located within the container;

determining by the data unit whether a security condition has occurred based on sensed changes in value sensed by the sensor;

communicating by the data unit, of a result of the determining step to an antenna interoperably connected to the data unit and located relative to the container in a position for transmitting data to a location outside the container;

15 transmitting by the antenna of information relative to the communication step.

45. A method of detecting a security breach of a container, the method comprising the steps of:

placing a sensor inside the container;

monitoring the sensor via a data unit located within the container;

5 determining, by the data unit, whether a security breach of the door has occurred based on a change in a condition sensed by the sensor;

communicating, by the data unit, of a result of the determining step to an antenna interoperably connected to the data unit and located adjacent to and outside of the container; and

10 transmitting, by the antenna, of information relative to the communicating step.

46. A device for monitoring the condition of and tracking a container, the device comprising:

15 means for sensing at least one condition of the container;

means for transmitting information relative to the container position and the at least one sensed condition to a location outside the container;

means for interpreting the at least one sensed condition; and

20 wherein the means for interpreting is adapted to be disposed inside the container.